CLAIMS

What is claimed is:

1. A hydrocyclone liner comprising:

a head section having a fluid inlet and overflow outlet, the head section providing an involute formed primarily of a first material having a first resistance to erosion;

a separation section having an underflow outlet, the separation section being formed primarily of a second material having a second resistance to erosion; and wherein

the first resistance to erosion is generally greater than the second resistance to erosion.

2. The hydrocyclone liner of claim 1 wherein the head section and separation section are removably affixed to one another.

3. The hydrocyclone liner of claim 1 further comprising a reinforcement layer disposed upon the separation section.

4. The hydrocyclone liner of claim 3 wherein the reinforcement layer is comprised of a fiber-reinforced epoxy.

5. The hydrocyclone liner of claim 4 wherein the fiber-reinforced epoxy is reinforced with carbon fibers.

6. The hydrocyclone liner of claim 4 wherein the fiber-reinforced epoxy is reinforced with glass fibers.

7. The hydrocyclone liner of claim 4 wherein the fiber-reinforced epoxy contains a plurality of fibers that are disposed axially within the epoxy to provide resistance to bending of the separation section.

8. The hydrocyclone of claim 3 wherein the reinforcement layer is formed of a sprayed on material.

9. The hydrocyclone liner of claim 1 wherein the separation section comprises a pair of tubular portions that are interconnected by a tubular joint member.

10. The hydrocyclone liner of claim 1 wherein the first material comprises tungsten carbide.

11. The hydrocyclone liner of claim 1 wherein the first material comprises silicon carbide.

12. The hydrocyclone liner of claim 1 wherein the second material comprises ceramic.

13. The hydrocyclone liner of claim 1 wherein the second material comprises surface engineered stainless steel.

14. The hydrocyclone liner of claim 13 wherein the second material is surface engineered by case hardening.

15. The hydrocyclone liner of claim 13 wherein the second material is surface engineered by coating.

16. A hydrocyclone liner comprising:

a head section having a fluid inlet and overflow outlet; and

a separation section having an underflow outlet, the separation section being removably affixed to the head section.

17. The hydrocyclone liner of claim 16 further comprising an external structural support for the separation section.

18. The hydrocyclone liner of claim 16 wherein the head section is formed of a material that provides a greater erosion resistance than that provided by the separation section.

19. The hydrocyclone liner of claim 16 wherein the head section is substantially formed of tungsten carbide.

20. The hydrocyclone liner of claim 16 wherein the head section is substantially formed of silicon carbide.

21. The hydrocyclone liner of claim 16 wherein the separation section is substantially comprised of a stainless steel duplex material.

22. The hydrocyclone liner of claim 16 wherein the head section and the separation section are removably affixed by a flange assembly.

23. The hydrocyclone liner of claim 17 wherein the structural support comprises a sleeve formed of a fiber-reinforced epoxy.

24. The hydrocyclone liner of claim 17 wherein the structural support comprises a tubular joint that interconnects portions of the separation section.

25. A hydrocyclone liner comprising:

a head section having a fluid inlet and overflow outlet, the head section containing an involute being substantially formed of a highly erosion-resistant first material; and

a separation section having an underflow outlet, the separation section being formed of a second material that is more physically resistant to bending and impacts than the first material.

26. The hydrocyclone liner of claim 25 wherein the separation section is removably affixed to the head section.

27. The hydrocyclone liner of claim 25 wherein the first material comprises tungsten carbide and the second material comprises hardened stainless steel duplex.

28. The hydrocyclone liner of claim 25 wherein the head section contains a removable involute insert formed of highly erosion resistant material.